Space Weather Forecast

Issued on Tuesday, 03 January 2023 at 13:32 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate solar activity throughout. Chance of Minor Geomagnetic Storm intervals from 03 January to 05 January.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Low with only Common-class flares observed, with a region in the northeast quadrant the most active visible region. The remaining regions have all been relatively muted. A large region behind the southeastern limb has produced an ongoing long period Common-class flare and a CME from the farside of the Sun. No Earth-directed CMEs have been observed on available imagery.

Solar Wind / Geomagnetic Activity: Solar winds have reached background values through the last 24 hours as the Earth exits a region of fast solar winds. Total magnetic field strength has been weak, with the north-south component also varying weakly. Geomagnetic activity was mainly Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary
Solar Activity: Mainly Low solar activity is expected, but with an increasing risk of both M-class and X-class flares due to regions beyond the southeastern limb, which are due to become visible from 04 January

Solar Wind / Geomagnetic Activity: A CME which left the Sun on 30 December, is forecast to arrive during 03 January with a glancing blow possible. Solar wind speeds are expected to rise from background levels on 04 January due to a potential combination of fast winds from two regions on the solar disc, which are forecast to connect with the Earth, giving estimated speeds in the region of 500km/s. These speeds are then likely to continue through much of 05 and 06 January. Geomagnetic activity is forecast to be mainly Quiet to Unsettled, with a possible increase to Active or G1/Minor Storm levels should the CME arrive. Further G1/Minor Storm levels are possible due to the fast wind connection on 04 January, with these perhaps continuing into 05 January.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain at background with no solar radiation storms occurring. However, there is a slight chance of these rising in response to any larger flares that may occur, and perhaps exceeding the S1/Minor Radiation storm level.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	30	30	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	30	40	40	40
Very Active	R3 to R5 X	No	5	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	10	10	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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